Airworthiness Certification

Grumman

OV-1

AIR-230 Airworthiness Certification Branch
Federal Aviation Administration
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Introduction – OV-1 Airworthiness Certification

This document provides information to assist in the airworthiness certification and safe civil operation of a OV-1 aircraft.

Attachment 1 provides a general overview of this document. Attachment 2 contains background information on the OV-1 aircraft. Attachment 3 lists historic airworthiness issues with the OV-1 for consideration in the certification, operation, and maintenance of these aircraft. The list is not exhaustive, but includes our current understanding of risks that should be assessed during in the certification, operation, and maintenance of these aircraft. Concerns regarding particular issues may be mitigated in various ways. Some may be mitigated via the aircraft maintenance manual(s) or the aircraft inspection program. Others may be mitigated via operating procedures i.e., SOPs) and limitations, aircraft flight manual changes, or logbook entries

Not all issues in attachment 3 may apply to a particular aircraft given variations in aircraft configuration, condition, operating environment, or other factors. Similarly, circumstances with an aircraft may raise other issues not addressed by attachment 2 that require mitigation. Attachment 4 includes additional resources and references.

Attachment 1 – Overview of this Document

Purpose

This document is to provide all those involved in the certification, operation, and maintenance of the OV-1 aircraft with safety information and guidance to help assess and mitigate safety hazards for the aircraft. The existing certification procedures in FAA Order 8130.2, Airworthiness Certification of Aircraft and Related Products, do not account for many of the known safety concerns and risk factors associated with many high-performance former military aircraft. These safety concerns and risk factors associated with many high performance former military aircraft include—

- Lack of consideration of inherent and known design failures;
- Several single-point failures;
- Lack of consideration for operational experience, including accident data and trends;
- Operations outside the scope of the civil airworthiness certificate;
- Insufficient flight test requirements;
- Unsafe and untested modifications;
- Operations over populated areas (the safety of the non-participating public has not been properly addressed in many cases);
- Operations from unsuitable airports (i.e., short runways, Part 139 (commercial) airports);
- High-risk passenger carrying activities taking place;
- Ejection seat safety and operations not adequately addressed;
- Weak maintenance practices to address low reliability of aircraft systems and engines;
- Insufficient inspection schedules and procedures;
- Limited pilot qualifications, proficiency, and currency;
- Weapon-capable aircraft not being properly demilitarized, resulting in unsafe conditions;
- Accidents and serious incidents not being reported; and
- Inadequate accident investigation data.

Research of OV-1 Safety Data

The aircraft, relevant processes, and safety data are thoroughly researched and assessed. This includes—

- Aviation Safety (AVS) Safety Management System (SMS) policy and guidance;
- Historical military accident/incident data and operational history;
- Civil accident data;
- Safety risk factors;
- Interested parties and stakeholders (participating public, non-participating public, associations, service providers, air show performers, flying museums, government service providers, airport owners and operators, many FAA lines of business, and other U.S. Government entities);
- Manufacturing and maintenance implications; and
- Design features of the aircraft.

This Document

The document is a compilation of known safety issues and risk factors identified from the above research that are relevant to civil operations. This document is organized into four major sections:

- General airworthiness issues (grey section),
- Maintenance (yellow section),
- Operations (green section), and
- Risk management, standard operating procedures and best practices (blue section).

This document also provides background information on the aircraft and an extensive listing of resources and references.

How to Use the Document

This document was originally drafted as job aids intended to assist FAA field office personnel and operators in the airworthiness certification of these aircraft. As such, some of the phrasing implies guidance to FAA certification personnel. The job aids were intended to be used during the airworthiness certification process to help identify any issues that may hinder the safe certification, maintenance, or operation of the aircraft. The person performing the certification and the applicant would to discuss the items in the job aid, inspect documents/records/aircraft, and mitigate any issues. This information would be used to draft appropriate operating limitations, update the aircraft inspection program, and assist in the formulation of adequate operating procedures. There are also references to requesting information from, or providing information to the person applying for an airworthiness certificate. We are releasing this document as drafted, with no further updates and revisions, for the sole purpose of communicating safety information to those involved in the certification, operation, and maintenance of these aircraft. The identified safety issues and recommended mitigation strategies are clear and can be considered as part of the certification, operation, and maintenance of the air aircraft.

Attachment 2—Background Information on the OV-1 Aircraft

The Mohawk was developed by Grumman Aircraft as a photo observation and electronic reconnaissance aircraft for the U.S. Army. The first Mohawk (YAO-1) prototype flew in 1959. The OV-1 entered production in October 1959 and served the U.S. Army in Europe, Korea, Central and South America, Alaska, and during the Vietnam War and Desert Shield/Desert Storm in the Middle East. The Mohawk was retired from service in September 1996. A total of 380 OV-1 Mohawks were produced between 1957 and 1969. As of August 2012, 22 OV-1s are registered in the United States and at least 10 are believed to be operational.

Source: U.S. Army.

OV-1 Mohawk Variants

YAO-1 (YOV-1A): Initial prototypes (9 built); OV-1A (AO-1AF): Daylight observation variant (64 built); OV-1B (AO-1BF): SLAR variant (101 built); OV-1C (AO-1CF): IR reconnaissance variant (169 built); OV-1D: Consolidated sensor variant (37 new, 82 conversions); JOV-1A: OV-1As and OV-1Cs fitted with armament (59 conversions); RV-1C: Quick Look ELINT machines (2 conversions); RV-1D: Quick Look II ELINT machine (31 conversions); OV-1E: Prototype for unproduced modernized variant.

Source: U.S. Army.

Specifications (OV-1)

Source: U.S. Army.

General Characteristics

- Crew: two - pilot and observer
- Length: 41 ft 0 in
- Wingspan: 48 ft 0 in
- Height: 12 ft 8 in
- Wing area: 360 ft^2
- Empty weight: 12,054 lb
- Loaded weight: 15,544 lb
- Maximum takeoff weight: 18,109 lb
- Powerplant: 2 × Lycoming T53-L-701 turboprops, 1,400 shp each

Performance

- Never exceed speed: 450 mph (390 knots)
- Maximum speed: 305 mph (265 knots, 491 km/h) at 10,000 ft
- Cruise speed: 207 mph (180 knots)
- Stall speed: 84 mph (73 knots)
- Range: 944 mi (820 nm)
- Service ceiling: 25,000 ft
- Rate of climb: 3,450 ft/min

Source: NASA.

Issue #	Issue(s)	Recommended Review, Action(s), and Coordination with Applicant	Notes, Action(s) Taken, and Disposition
OV-1 Preliminary and General Airworthiness Inspection Issues			
1.	Aircraft Familiarization	Become familiar with the aircraft before initiating the certification process.	
2.	Preliminary Assessment	Conduct a preliminary assessment of the aircraft to ascertain condition and general airworthiness.	
1.	Denial	If the aircraft does not meet the certification requirements and the special airworthiness certificate is denied, the FAA will provide a letter to the applicant stating the reason(s) for denial and, if feasible, identify which steps may be accomplished to meet the certification requirements. Should this occur, a copy of the denial letter will be attached to FAA Form 8130-6 and forwarded to AFS-750, and made a part of the aircraft's record.	
2.	Potential Reversion Back to Phase I	Notify the applicant that certain modifications to the aircraft will invalidate Phase II. These include: (a) structural modifications, (b) aerodynamic modifications, including externally mounted equipment except as permitted in the limitations issued, and (c) change of engine make, model, or power rating (thrust or horse power). The owner/operator may return the aircraft to Phase I in order to flight test specific items as required. However, major modifications such as those listed above may require new operating limitations.	
3.	Airframe and Engine Data	Ask the applicants to provide the following: Airframe: import country, N-Number, manufacture year and serial number, airframe time, and airframe cycles. Engine: manufacture date and serial number, overhaul data and location, serial number, and engine time, cycles, and date(s).	
4.	FAA Records Review	Review the existing FAA airworthiness and registration files (EDRS) and search the Program Tracking and Reporting Subsystem (PTRS) for safety issue(s) and incidents.	
5.	Use FAA Form 8100-1	Use FAA Form 8100-1 to document the airworthiness inspection. Using this form facilitates the listing of relevant items to be considered, their nomenclature, any reference (that is, North Atlantic Treaty Organization (NATO) manual; FAA Order 8130.2, Airworthiness Certification of Aircraft and Related Products; regulations) revision, satisfactory or unsatisfactory notes, and comments. Items to be listed include but are not limited to— 1. FAA Form 8130-6; 2. § 21.193 of Title 14, Code of Federal Regulations (14 CFR); 3. FAA Form 8050-1; 4. 14 CFR Part 45, § 45.11(a); 5. FAA Order 8130.2, paragraph 4002a (7) and (10), 4002b(5), 4002b(6), 4002b(8), 4111c, and 4112a(2); 6. 14 CFR § 91.205; 7. 14 CFR § 91.417(a)(2)(i), Airframe Records and Total Time, Overhaul; and 8. 14 CFR § 91.411/91.413, Altimeter, X-ponder, Altitude Reporting, Static System Test.	
6.	Functionality Check	Ask the applicant to prepare the aircraft for flight including all preflight tasks, startup, run-up, and taxi as part of the airworthiness certification. The U.S. Army's Maintenance Flight Manual for the OV-1 should be used as a reference.	

Issue #	Issue(s)	Recommended Review, Action(s), and Coordination with Applicant	Notes, Action(s) Taken, and Disposition
7.	Adequate Manuals and Related Documentation	To safely operate an OV-1, the owner/operator must have a complete list of the applicable OV-1 manuals such as flight manuals, inspections, and maintenance (U.S. Army) manuals. Documentation concerning inspection schedules and replacement times should also be available. • U.S. Army Operators Manual for the OV-1A, OV-1B, OV-1C, TM 55-1510-204-10, September 1963. • U.S. Army Operators Manual for the OV-1D and RV-1D, TM 55-1510-213-10, August 1978. • Technical Manual, Organizational, DS, and GS Maintenance Manual Ejection Seat, Model Mk-J5D (Martin-Baker), TM 55-1680-308-24, 1972. • Grumman OV-1C Operator's and Crewmember's Checklist, TM 55-1510-204-CL/4, 1979. • Grumman OV-1D/RV-10D Pilot's Checklist, TM 55-1510-213-CL, November 1978. • Grumman OV-1A 1964 Field Maintenance Manual TM 55-1510-204-34, 1964. • Grumman OV-1D Aircraft Organizational Maintenance Manual, TM 55-1510-204-20P, 1971. • U.S. Army Aircrew Training Manual (ATM) FC 1-217, December 1984.	
8.	Limiting Duration of Certificate	Refer to FAA Order 8130.2, regarding the duration of certificates, which may be restricted if the FAA finds cause. It would be possible to permit operations for a period of time to allow the implementation of a corrective action or changes in limitations.	
9.	OV-1 Version	Identify the specific OV-1 version being certificated. There are major differences among OV-1 aircraft. Mohawk variants included the JOV-1 [armed reconnaissance], OV-1A [visual and photographic], OV-1B [visual, photographic, and side-looking radar (SLAR) pod], the OV-1C [visual, photographic, and infrared], and the OV-1D [SLAR pod and bigger wings], OV-1E [enlarged fuselage for more sensor operators or cargo], EV-1E [special electronic intelligence installation] and RV-1E [advanced ELINT reconnaissance].	
10.	Applicant/Operator Capabilities	Review the applicant/operator's capabilities, general condition of working/storage areas, availability of spares and equipment.	
11.	Scope and Qualifications for Restoration, Repairs or Maintenance	Become familiar with the scope of the OV-1 restoration/repairs/maintenance conducted by or for the applicant.	
12.	Operational Risk Management (ORM)	Recommend the OV-1 owner/operator implement an ORM-like approach. ORM employs a five-step process: (1) Identify hazards, (2) Assess hazards, (3) Make risk decisions, (4) Implement controls and (5) Supervise.	
13.	Multiple Certificates and Public Air Operations, That Is, Department of Defense (DOD) contracts. Also Refer to *Military Operations* below.	In those cases involving multiple certificates, such as Exhibition and Research and Development (R&D), ensure the applicant submits information describing how the aircraft configuration is changed from one to the other. This is important because some R&D activities may involve equipment that must be removed to revert back to the Exhibition configuration. Moreover, the procedures should provide for any additional requirement(s), such as additional inspections, to address situations such as high-G maneuvering that could have an impact on the aircraft and/or its operating limitations. Similarly, removing equipment that could be considered part of a weapon system may be required (refer to *Demilitarization* below). All applications for the R&D must adhere to FAA Order 8130.29, Issuance of a Special Airworthiness Certificate for Show Compliance and/or Research and Development Flight Testing. A similar process should be identified to revert back from public aircraft operations.	

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OV-1 Maintenance Manual(s), Aircraft Inspection Program (AIP), and Servicing			
14.	Changes to Aircraft Inspection Program (AIP)	Consider whether the FAA-accepted AIP is subject to revisions to address safety concerns, alterations, or modifications to the aircraft. Section 91.415, Changes to Aircraft Inspection Programs, requires "whenever the Administrator finds that revisions to an approved aircraft inspection program under § 91.409(f)(4) or § 91.1109 are necessary for the continued adequacy of the program, the owner or operator must, after notification by the Administrator, make any changes in the program found to be necessary by the Administrator."	
15.	Maintenance Practices	In addition to any guidance provided by the manufacturer/military service(s), consider Advisory Circular (AC) 43.13-2, Acceptable Methods, Techniques, and Practices-Aircraft Alterations, and AC 43.13-1, Acceptable Methods, Techniques, and Practices-Aircraft Inspection and Repair, to verify safe maintenance practices.	
16.	Modifications	Per § 21.93, verify changes do not create an unsafe condition and determine whether new operating limitations will be required. The information contained in appendix A to part 43 can be used as an aid.	
17.	Prioritize Maintenance Actions	Recommend the adoption of a risk management system that reprioritizes high-risk maintenance actions in terms of (a) immediate action, (b) urgent action, and (c) routine action. Also refer to *Recordkeeping, Tracking Discrepancies, and Corrective Action* below.	
18.	Recordkeeping, Tracking Discrepancies, and Corrective Action	Check applicant recordkeeping. The scope and content of §§ 43.9, 43.11, and 91.417 are acceptable. The U.S. Air Force (USAF) Form 781 process or the U.S. Navy's Maintenance Action Form (MAF) process will assist with recordkeeping and help verify acceptable levels of continued operational safety (COS) for this type of aircraft. Three types of maintenance writeups can be found inside USAF Form 781: (1) an informational, that is, a general remark about a problem that does not require mitigation; (2) a red slash for a potentially serious problem; and (3) a red "X" highlighting a safety of flight issue that could result in an unsuccessful flight and/or loss of aircraft—no one should fly the aircraft until the issue is fixed. For more information on recordkeeping, refer to AC 43-9, Maintenance Records.	
19.	Qualifications of Maintenance Personnel	Check for appropriate qualifications, licensing, and type-specific training of personnel engaged in managing, supervising, and performing aircraft maintenance functions and tasks. The National Transportation Safety Board (NTSB) has found the use of non-certificated mechanics to perform the work on this type of aircraft has been a contributing factor to accidents. Recommend only FAA-certificated repair stations and FAA-certificated mechanics with appropriate ratings as authorized by § 43.3 perform maintenance on this aircraft.	
20.	Ground Support, Servicing, and Maintenance Personnel Recurrent Training	Recommend regular refresher training be provided to ground support, servicing, and maintenance personnel concerning the main safety issues surrounding servicing and flight line maintenance of the OV-1. Such a process should emphasize a recurrent and regular review of the warnings, cautions, and notes listed in the applicable U.S. Army technical publications for the aircraft.	
21.	Parts Storage and Management and Traceability	Recommend establishing a parts storage program that includes traceability of parts.	
22.	Maintenance Records and Use of Tech Data	As required by FAA Order 8130.2, conduct a detailed inspection of maintenance records. Verify maintenance records reflect inspections, overhauls, repairs, time-in-service on articles, and engines. Ensure all records are current and appropriate technical data is referenced. This is should not be a cursory review. Refer to *Adequate Manuals and Related Documentation* above.	
23.	Adequate Maintenance Schedule and Inspection Program(s)	Review the AIP for compliance with the U.S. Army's inspection programs when developing an inspection program under § 91.409. A 100-hour, 12-month inspection program under appendix D to part 43 is generally not adequate for sophisticated aircraft like the OV-1. The inspection program must comply with both hourly (that is, an inspection at 750 hours) and calendar (14 days, 6 months) inspection schedules and may exclude weapon and other military-specific components.	

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24.	Replacement Intervals	Verify compliance with required replacement intervals. If components are not replaced per the manufacturer's requirements, ask for data to justify extensions (for example, 1,000 hours instead of 500 hours). Applicants should establish and record time in service for all life limited (replacement intervals) components and verify compliance with approved life limits. Set time limits for overrun of intervals and track cycles. Evaluate any overruns of inspection or maintenance intervals. Concurrence should not be given automatically if it is in the proposed AIP or if the applicant requests it. If inspections or maintenance are overrun, a Special Flight Permit may be requested to fly the aircraft to a location where maintenance can take place.	
25.	"On Condition" Inspections	If "on condition" inspections are considered, adhere to the manufacturer's program and/or provide adequate data to justify that practice for the applicable part or component. "On condition" inspections are not appropriate to all parts and components. For example, there is no "on condition" inspection for ejection seat pyrotechnics nor should "on condition" inspections replace time limitations. "On condition" inspections must reference an applicable standard and/or a set of tolerances (that is, inspect the fuel pump to an acceptable reference standard, not just "it has been working" or "has been visually inspected").	
26.	Service Bulletins	Require compliance with the U.S Army's OV-1 service bulletin-like documents and orders.	
27.	Whether an IRAN Replaces or Supplements Other Inspections	If inspect and repair as necessary (IRAN) is proposed, verify it is detailed and uses adequate technical data (that is, include references to acceptable technical data) and adequate sequence for its completion. An IRAN must have a basis and acceptable standards. It is not analogous to an "on condition" inspection.	
28.	Aircraft Storage and Returning the Aircraft to Service After Inactivity	Verify the applicant has a program to address aircraft inactivity and specify specific maintenance actions for return to service per U.S. Army procedures and inspection schedule.	
29.	Manufacturer's and/or U.S. Army Modifications	Verify the AIP addresses the incorporation of the manufacturer's and U.S. Army modifications to the T-53 engine installed. The NTSB and other foreign civil aviation authorities (CAA) have determined a causal factor in accidents is the failure of some civil operators of former military aircraft to incorporate the manufacturer's recommended modifications to prevent engine failures.	
30.	Specialized Tooling for OV-1 Maintenance	Verify adequate tooling, jigs, and instrumentation are used for the required periodic inspections and maintenance per the OV-1 U.S. Army maintenance manuals.	
31.	T-53 Engine Time Between Overhaul (TBO)	Verify the applicant has established the proper inspection intervals and TBO/replacement interval for the specific engine type and adheres to those limitations and replacement intervals for related components. "On condition" or "visual" do not replace manufacturer's inspection processes and replacement times. Justification and FAA concurrence is required for a higher TBO. Note: Several engines lack documentation and have been represented to be of a higher TBO range than they actually are. There must be data on TBO/time remaining on the engine at time of certification. It is also critical to document those throughout the aircraft life cycle.	
32.	Engine Thrust	Verify the AIP addresses measuring actual thrust of the engine and tracking engine operating temperatures.	
33.	Ruptured Oil Lines	Inspect and replace oil lines.	
34.	Fire Detection and Suppression System	Verify the fire detection and suppression system is properly serviced and adheres to replacement intervals. Note: If Halon is used, address any applicable issues concerning the Halon such as alternatives and environmental requirements. Halon may have EPA or other health restrictions. Refer to Guidance for the EPA Halon Emission Reduction Rule (40 CFR part 82, Subpart H).	
35.	Servicing and Engine Fires	Verify the operator warns servicing personnel via training and markings of the hazard of servicing an OV-1. Lack of experience with OV-1 servicing is a safety concern.	

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36.	Engine Start	Verify there are provisions and procedures to document all unsuccessful starts. This is useful in documenting engine problems.	
37.	Engine Storage	Review T-53 engine storage methods and ascertain engine condition after storage, to include actual calendar time since overhaul. Calendar times will have an impact on the inspection of the engine. Accidents have occurred because engines were not overhauled when they needed to be. Note: The FAA's position on experimental exhibition of former military aircraft is that engines which have exceeded storage life limits are susceptible to internal corrosion, deterioration of seals and coatings, and breakdown of engine preservation lubricants.	
38.	Engine Condition Monitoring	Establish an engine oil sampling program (SOAP) at intervals of less than 10 hours. If baseline data exists, this can be very useful for failure prevention. If manufacturer baseline data does not exist, this may still warn of impending failure.	
39.	Engine Foreign Object Damage (FOD)	Verify adoption of a FOD prevention program (internal engine section, external, and air intake).	
40.	Use of Different Fuels	Verify the AIP and operational procedures consider the type of fuel impact on T-53 inspection and maintenance program.	
41.	Fuel Tank Leaks	Adhere to the maintenance schedule for fuel tanks or provide adequate technical data to show an equivalent level of safety. Inspect as necessary as required by the U.S. Army. The age of the aircraft dictates this practice. Without adequate data, this is not acceptable, and even if there is data, it should address a limited extension, not doubling the component's life limit or extending its life limit in perpetuity.	
42.	Oil, Fuel, and Hydraulic Fluids	Develop and use a list of equivalents of materials for replacing oil, fuel, and hydraulic fluids per the manufacturer requirements. A good practice by many operators is to include a cross reference chart for NATO and U.S. lubricants as part of the AIP. Note: On the OV-1, the auxiliary ailerons, speed brakes, and flaps were hydraulic.	
43.	Hydraulic System Problems	Adhere to the U.S. Army's inspection guidelines and replacement times.	
44.	Electrical System and Batteries	Verify the AIP provides for the functionality of the generator and the compatibility of the aircraft's electrical system with any new battery installation.	
45.	Pitot/Static, Lighting, and Avionics and Instruments	Verify compliance with all applicable 14 CFR requirements concerning the pitot/static system, exterior lighting (that is, adequate position and anti-collision lighting) and transponder. Maintain and inspect all avionics and related instruments.	
46.	Oxygen System	Emphasize the inspection of the oxygen system and any modifications. The OV-1 requires a functional, well-maintained oxygen system for high-performance flight. Compliance with § 91.211, Supplemental Oxygen is required and recommend adherence to 14 CFR § 23.1441, Oxygen Equipment and Supply. Moreover, as per FAA Order 8900.1, change 124, chapter 57, Maintenance Requirements for High-Pressure Cylinders Installed in U.S. Registered Aircraft Certificated in Any Category, each high-pressure cylinder installed in a U.S.-registered aircraft must be a cylinder manufactured and approved under the requirements of 49 CFR, or under a special permit issued by the Pipeline and Hazardous Materials Safety Administration (PHMSA) under 49 CFR part 107. There is no provision for the FAA to authorize "on condition" for testing, maintenance, or inspection of high pressure cylinders under 49 CFR (PHMSA). The O2 bottles are time-sensitive items, usually with 10 years for hydrostatic testing. The issue is when the bottles are removed from the aircraft. As an industry member states, when the bottles are installed, "and they are within their hydrostatic test dates, all is good. Where [one of] the problems lies is removing them for hydrostatic testing. Maintenance programs require these bottles to be hydrostatic tested. Once the bottles are removed from the aircraft, they are not supposed to be hydrostatic tested, recharged, or reinstalled in any aircraft." Moreover, they cannot be serviced (on board) after the testing date has expired.	

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47.	Other High-Pressure Cylinders	Emphasize the proper inspection of any other high-pressure cylinders installed in the aircraft, that is, fire bottles and nitrogen gas (N2). As per FAA Order 8900.1, change 124, chapter 57, Maintenance Requirements for High-Pressure Cylinders Installed in U.S. Registered Aircraft Certificated in Any Category, each high-pressure cylinder installed in a U.S.-registered aircraft must be a cylinder manufactured and approved under the requirements of 49 CFR part 107. There is no provision for the FAA to authorize "on condition" for testing, maintenance, or inspection of high-pressure cylinders under 49 CFR (PHMSA). For example, the fire bottles are time-sensitive items, and may have a limit of 5 years for hydrostatic testing. The issue is when the bottles are removed from the aircraft. It is industry knowledge that non-U.S. bottles may be installed as long as they are within their hydrostatic test dates. A problems arises when removing them for hydrostatic testing. Maintenance programs require these bottles to be hydrostatic tested. Once the non-U.S. bottles are removed from the aircraft, they are not supposed to be hydrostatic tested, recharged, or reinstalled in any aircraft. Moreover, they cannot be serviced (on board) after the testing date has expired.	
48.	Cockpit FOD	Verify the AIP addresses thorough inspection and cleaning of the cockpit area to preclude inadvertent ejection, flight control interference, pressurization valves clogging, and other problems. This is a standard USAF/U.S. Navy practice.	
49.	Canopy Safety	Ensure AIP addresses the proper maintenance of transparencies and canopy locks. Monitoring and inspection of the canopy for crazing should be conducted at every 10 hours of flight. Canopy failures, de-laminations, and Plexiglas deterioration are common with aging components. Procedures should address this in the AIP and as part of post flight procedures.	
50.	Corrosion Due to Age and Inadequate Storage	Evaluate adequacy of corrosion control procedures. Age, condition, and types of materials used in the OV-1 may require some form of corrosion inspection control. Ask whether a corrosion control program is in place. If not, ask for steps taken or how it is addressed in the AIP. Finish damage, moisture entrapment, and surface corrosion on flight control push rods and bearings are common. An emphasis on critical flight items like main structural elements, attach points, and flight controls should be made because corrosion has also been noted in OV-1 horizontal tail structures. TO 1-1-691, Corrosion Prevention and Control Manual can be used as a reference.	
51.	Cycles	Ask if airframe and engine cycles are tracked, in addition to hours and calendar time. This helps increase safety margins and is a safe practice with an engine type like the T-53, where cycles can supplement hours.	
52.	Safety Markings and Stenciling	Verify appropriate markings (that is, safety stenciling and "Remove Before Flight" banners) are in English and applied to areas of the aircraft that could be dangerous to anyone unfamiliar with the aircraft, including areas such as intakes, exhaust, air brakes, and ejection seats. Note: With regards to ejections seat systems, as noted in FAA Order 8130.2, "a special airworthiness certificate will not be issued before meeting this [marking] requirement."	
53.	Tires and Wheels	Verify use of proper tires and/or equivalent substitutes (including inner tubes) and adherence to any tire limitation. Wheels must be properly and regularly inspected and balanced.	
54.	Explosives and Propellants	Ensure verifying manufacturer's and service requirements are followed in addition to compliance with applicable Federal, State, and local requirements for explosives and propellants in terms of use, storage, and disposal.	
55.	External Drop Tanks	Verify the condition, installation, and removal of external drop tanks are acceptable per U.S. Army's requirements. Verify external drop tanks are cleared for use in the aircraft, and there is no means of jettisoning these tanks while on the ground or in flight. There should not be any modifications to the external drop tanks.	
56.	Old Hoses and Cables	Inspect and replace hoses and cables appropriately	
57.	Grounding	Verify adequate procedures are in place for grounding the aircraft.	
58.	Hard Landings and Over G Situations	Verify hard landing and over-G inspection programs are adopted. This is especially important when acrobatics are performed or when the aircraft is involved in military support missions outside the scope of its experimental certificate (that is, public aircraft operations).	

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59.	Wing and Tail Bolts and Bushings	Ask about inspections and magnafluxing of these items. Recommend the AIP incorporate other commonly used and industry-accepted practices involving non-destructive inspection (NDI) if not addressed in the manufacturer's maintenance and inspection procedures.	
60.	Flight Control Balancing and Repairs	Verify flight controls were balanced per the maintenance manual(s) after materials replacement, repairs, and painting. Note: Damage to flight controls has been noticed when inadequate repairs have been performed. If there are no adequate records of the balancing of the flight controls, the airworthiness certificate should not be issued.	
61.	Flight Controls Rigging and Deflection	Verify proper rigging and deflection. If there are no adequate records of the proper rigging and deflection of flight controls, the airworthiness certificate should not be issued.	
62.	Replacement of Magnesium Skin With Aluminum	Ensure the AIP addresses any and all modifications and balancing after skin replacement. Corrosion must be addressed and mitigated.	
63.	Parts Fabrication	Verify engineering (that is, Designated Engineering Representative (DER)) data supports any part fabrication by maintenance personnel. This is an issue because it is a common practice in restorations. Unfortunately, many of these modifications have been made without adequate technical and validation data. AC 43-18, Fabrication of Aircraft Parts by Maintenance Personnel, may be used for guidance.	
64.	Accurate Weight & Balance (W&B) Basic References and Calculations	Verify original W&B records meet the applicable U.S. Army guidance and, when applicable, are consistent with FAA-H-8083-1, Aircraft Weight and Balance Handbook, if documentation by the applicant appears inadequate. If there are no adequate records of the proper W&B data, the airworthiness certificate should not be issued.	
65.	Martin-Baker Mk.5 Ejection Seat Type/Version	Verify the type and version of the ejection seat. The OV-1 Mohawk was originally equipped with a Martin-Baker J5 seat. This seat used staged explosive charges through a telescoping ejection tube and was not zero-zero capable. The Mohawk was subsequently refitted with a modified J5D seat. This seat added a rocket motor and gave the seat a zero-sixty knots capability. This was zero altitude and sixty knots of speed on the runway for a successful ejection. It was standard procedure during takeoffs for the pilot to call out 60 knots to let the systems operator know ejection was now possible.	
66.	Martin-Baker Mk.J5D Ejection Seat System Maintenance	Ensure maintenance and inspection of ejection seat and other survival equipment is performed in accordance with the U.S. Army's procedures and applicable technical manuals (TM) and by trained personnel. The main reference is the most current version of TM 55-1680-308-24 Technical Manual, Organizational, DS, and GS Maintenance Manual, Ejection Seat, Model Mk-J5D (Martin-Baker), Part No. 134AB80000. Note: The ejection seat manufacturer, Martin-Baker, still provides support for its ejection seats, including the Mk. 5. Therefore, maintenance by Martin-Baker is also acceptable (and actually preferred) as an alternative. Regardless, no "on condition" determinations on rocket charges, propellants, and initiators are acceptable. Include specific inspections and recordkeeping for pyrotechnic devices (explosives and propellants). Make the distinction between replacement times, that is, "shelf life" vs. "installed life limit." For example, a 9-year replacement requirement is not analogous to a 2-year installed limit. If such maintenance documentation and requirements are not available, the seat must be deactivated. Note: There is evidence many companies that "specialize" in ejection seats are not maintaining the seats adequately. Some of the issues are: (1) wrong setting on timers, (2) wrong break-away wires, (3) poor recordkeeping, and (4) expired pyrotechnics.	
67.	Emergency Canopy Jettison Mechanism	Verify the AIP includes testing the OV-1 emergency canopy jettison mechanism. It must be functional and properly inspected per the applicable technical guidance.	
68.	Martin-Baker Mk. J5D Ejection Seat System Maintainers Training	Require adequate ejection seat training for maintenance crews. There is evidence many operators and even companies that "specialize" in Martin-Baker ejection seats are not maintaining the ejection seats adequately. Some of the issues are: (1) expired pyrotechnics devices (explosives and propellants), (2) wrong break-away wires, (3) poor recordkeeping, and (4) wrong settings on timers. This training should be addressed in the AIP and related procedures. Note: On May 9, 2012, an improperly trained mechanic accidentally jettisoned the canopy of a jet warbird while performing maintenance, resulting in serious injuries.	

Issue #	Issue(s)	Recommended Review, Action(s), and Coordination with Applicant	Notes, Action(s) Taken, and Disposition
69.	"Experimental" Markings	Verify the word "EXPERIMENTAL" is located immediately next to the canopy railing, on both sides, as required by § 45.23(b). No subdued markings.	
70.	N-Number	Verify the marking required by §§ 45.25 and 45.29(b) concerning the registration number (N-number), its location, and its size are complied with. If non-standard markings are proposed, verify compliance with Exemption 5019, as amended, under regulatory Docket No. 25731.	
OV-1 Operating Limitations			
71.	AIP and Related Documentation	As part of the operating limitations, the operator must adhere to the AIP and related documentation.	
72.	Understanding of the Operating Limitations	Require the applicant to sign the Acknowledgment of Special Operating Limitations form.	
73.	OV-1 Pilot in Command (PIC) Requirements	Ensure the PIC holds the required authorization(s), airplane category, and class ratings, in addition to having a minimum amount of flight time and experience in a similar military type of aircraft, and must maintain a minimum level of proficiency, such as a total of 500 hours in twin-engine turboprop aircraft (1,000 hours if no prior military high-performance training). Recommend proficiency and currency of 5 hours per month and five takeoffs and landings.	
74.	Minimum Maneuver Standards	Recommend the U.S. Army Aircrew Training Manual (ATM) FC 1-217, December 1984, be used as part of OV-1 operations. This manual gives all the minimum maneuver standards of flight for pilot qualification in the OV-1.	
75.	Adequate Annual Program Letter	Verify the applicant's annual program letter is detailed enough and consistent with the applicable regulatory and policy requirements. (Many applicants/operators submit inadequate and vague program letters and fail to submit them on an annual basis.) Also verify the proposed activities (for example, an air show at a particular airport) are consistent with the applicable operating limitations (for example, avoiding populated areas) and do not pose a safety hazard, such as the runway being too short. Refer to http://www.warbirds-eaa.org/forms/	
76.	Flight Manuals and Operating Limitations	Ensure the PIC operates the aircraft as specified in the U.S. Army Flight Manual for the appropriate OV-1 version and the FAA-approved operating limitations.	
77.	Maintenance and Line Support	Ensure qualified crew chief/plane captains are used for safe OV-1 preflight and post-flight inspections, in addition to assisting the PIC during startup and shutdown.	
78.	Flight Servicing Certificate	Recommend a Flight Servicing Certificate or a similar document be used by the ground crew (that is, crew chief or plane captain) to attest to the aircraft's condition (that is, critical components such as tires) before each flight to include the status of all servicing (that is, liquid levels, fuel levels, nitrogen levels, oxygen).	
79.	Martin-Baker J5D Ejection Seat System PIC Training	Require adequate PIC ejection training for PIC and crew (if applicable). The operator should have an adequate training program. Recommend that operator seek training from companies specializing in such services. Notes: Survival rates of civilian ejections are poor. There are three documented ejections (2002, 2003, and 2006) by civilian pilots, which were fatal. A simple briefing or a general familiarization course is not enough, especially for the PIC. Past experience with other ejection seat systems, such as those found in U.S. military aircraft, does not necessarily qualify the PIC to verify safe operations with the J5D systems.	

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80.	Martin-Baker Mk. J5D Ejection Seat System Safety on the Ground	Verify the safety of the ejection seats on the ground. Verify the ejection seats cannot be accidentally fired, including prohibitions of untrained personnel from sitting on the seats during maintenance, servicing, air shows, or other exhibition of the aircraft. Note: As a result of accidents, DOD policy prohibits the public from sitting on armed ejection seats.	
81.	Ejection Seat Safety Pins	Require the PIC/crew to carry the aircraft's escape systems safety pins on all flights and high-speed taxi tests.	
82.	Parachutes	Comply with § 91.307, Parachutes and Parachuting. This regulation includes parachute requirements (1) that the parachute be of an approved type and packed by a certificated and appropriately rated parachute rigger, and (2) if of a military type, that the parachute be identified by an NAF, AAF, or AN drawing number, an AAF order number, or any other military designation or specification number. The parachute must also be rated for the particular ejection seat being used.	
83.	External Stores	Prohibit the installation of external stores to the wing that were not approved by the U.S. Army. Additionally, there should be no means, mechanically or otherwise, of jettisoning any external loads, including external drop tanks, while on the ground or in flight. The stores should be mechanically and permanently attached, and there should not be any cockpit control that would release them—no electric or cable connection.	
84.	Demilitarization	Verify the aircraft has been adequately demilitarized. Wiring, switches, pylons, and other subsystems, to include parts of the armament panel, need to be disabled as well.	
85.	Phase I Flight Testing	As part of Phase I flight testing, recommend that, at a minimum, all flight tests and flight test protocol(s) follow the intent and scope of acceptable U.S. Army functionality test procedures. Phase 1 means: The initial flight testing period for a newly assembled aircraft, not newly manufactured or newly built. TM 55-1500-325-25, Test Flights and Maintenance Operational Checks for Army Aircraft, is the appropriate manual. A checklist was used for test flights. The aircraft needs detailed Phase I flight testing, totaling a minimum of 10 hours. Returning a high-performance aircraft such as the OV-1 to flight status after restoration cannot be accomplished by a few hours of "flying around." Safe operations also require a demonstrated level of reliability.	
86.	Flight Over Populated Areas	Prohibit flights over populated areas, including takeoffs and landings, if the ejection seat is functional. If not, the aircraft may be operated over populated areas for the purpose of takeoff and landing only, and only in Phase II operations. The area on the surface described by the term "only for the purpose of takeoff and landing" is the traffic pattern. For the purpose of this limitation, the term "only for the purpose of takeoff and landing" does not allow multiple traffic patterns for operations such as training or maintenance checks.	
87.	Low Altitude Maneuvering	Recommend low altitude maneuvering be restricted. No acrobatics below 5,000 feet should be permitted except in accordance with an ICAS Statement of Aerobatic Competency. The OV-1's control sensitiveness was the cause of frequent accidents, especially early in its operational career, that is. A and B models. Spins are prohibited. The US Army did not practice are demonstrate spins.	
88.	Single-Engine Operations	Prohibit intentional single-engine operations unless at altitude and for training purposes. More than one OV-1 was lost when one engine failed and the immediate resulting roll flipped the aircraft into the ground. The aircraft is not a good single-engine performer and there is no benefit to "exhibiting" the aircraft's dangerous flight characteristics. V_{mc}, V_{sse}, and V_{yse} need to be considered. Possibly establishing a V_r above V_{mc} may be considered.	
89.	Visual Meteorological Condition (VMC) and Instrument Metrological Conditions (IMC) Operations	Recommend day VMC operations only. If IFR operations are permitted, prohibit known IMC conditions; the aircraft is not properly equipped for icing conditions. Comply with § 91.205.	
90.	Carrying of Passengers §91.319(a)(2)	Prohibit the carrying of passengers (and property) for compensation or hire at all times. For hire flight training is permitted only in accordance with an FAA-issued letter of deviation authority (LODA). FAA LODA policy limits training to pilots eligible for OV-1 experimental aircraft authorization.	

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91.	Minimum Equipment for Flight	Ask applicant to identify minimum equipment for flight. The applicant should develop a list consistent with the applicable military guidance (NATO is applicable) and § 91.213.	
92.	Minimum Runway Length	Ensure the PIC verifies, using the appropriate U.S. Army aircraft performance charts, that sufficient runway length is available considering field elevation and atmospheric conditions. To add a margin of safety, use the following: <u>For Takeoff</u> • No person may initiate an airplane takeoff unless it is possible to stop the airplane safely on the runway, as shown by the accelerate-stop distance data, and to clear all obstacles by at least 50 ft vertically (as shown by the takeoff path data) or 200 ft horizontally within the airport boundaries and 300 ft horizontally beyond the boundaries, without banking before reaching a height of 50 ft (as shown by the takeoff path data) and after that without banking more than 15 degrees. • In applying this section, corrections must be made for any runway gradient. To allow for wind effect, takeoff data based on still air may be corrected by taking into account not more than 50 percent of any reported headwind component and not less than 150 percent of any reported tailwind component. <u>For Landing</u> • No person may initiate an airplane takeoff unless the airplane weight on arrival, allowing for normal consumption of fuel and oil in flight (in accordance with the landing distance in the AFM for the elevation of the destination airport and the wind conditions expected there at the time of landing), would allow a full stop landing at the intended destination airport within 60 percent of the effective length of each runway described below from a point 50 ft above the intersection of the obstruction clearance plane and the runway. For the purpose of determining the allowable landing weight at the destination airport, the following is assumed: o The airplane is landed on the most favorable runway and in the most favorable direction, in still air. The airplane is landed on the most suitable runway considering the probable wind velocity and direction and the ground handling characteristics of that airplane, and considering other conditions such as landing aids and terrain.	
93.	Runway Considerations	Consider accelerate/stop distances, balanced field length, and critical field length in determining acceptable runway use per Classic Jet Aircraft Association (CJAA) guidance.	
94.	Servicing	Ensure the applicant verifies ground personnel are trained for OV-1 operations. They should be aware of the potential for fires during servicing and emergency procedures (that is, fire guard duty, rescue, and emergency shutdown).	
95.	External Drop Tank Failure	Restrict external drop tanks to only those cleared by the manufacturer. Adhere to the external drop tank limitations related to (1) takeoff and landing performance, (2) G limits, (3) airspeed, and (4) fuel in the tanks.	
96.	ARFF Coordination	Coordinate with Aircraft Rescue and Fire Fighting (ARFF) personnel at any airport of landing (that is, safety briefing, fuel system, ejection seat system, emergency shutdown).	
97.	ATC Coordination	Coordinate with Air Traffic Control (ATC) before any operation that may interfere with normal flow of traffic to ensure the requirement to avoid flight over populated areas is complied with. Note: ATC does not have the authority to waive any of the operating limitations or operating rules.	
98.	Personal Flight Equipment	Recommend operators use the adequate personal flight equipment and attire to verify safe operations. This includes: helmet, oxygen mask, fire retardant (Nomex) flight suit, gloves (that is, Nomex or leather), adequate foot gear (that is, boots), and clothing that does not interfere with cockpit systems and flight controls. Operating with a live ejection seat requires a harness. Therefore, recommend only an approved harness compatible with the ejection seat be used.	

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99.	Military Contract Operations	Some OV-1 operators may have entered into contracts with DOD to provide military missions such as air combat maneuvering (ACM), target towing, and electronic counter measures (ECM). Such operations constitute "public aircraft operations" (PAO), not civil operations under FAA jurisdiction. The operator is required to obtain a declaration of PAO from the contracting entity or risk civil penalty for operating the aircraft outside the limits of the FAA experimental certificate. Verify the operator understands PAO vs. operations under a civil certificate. For example, the purpose of an airworthiness certificate in the exhibition category is limited to activities listed in §21.191(d). Note: The following notice, which was issued by AFS-1 in March 2012, needs to be communicated to the applicant: "Any pilot operating a U.S. civil aircraft with an experimental certificate while conducting operations such as air-to-air combat simulations, electronic counter measures, target towing for aerial gunnery, and/or dropping simulated ordinances is operating *contrary* to the limits of the experimental certificate. Any operator offering to use a U.S. civil aircraft with an experimental certificate to conduct operations such as air-to-air combat simulations, electronic counter measures, target towing for aerial gunnery, and/or dropping simulated ordinances pursuant to a contract or other agreement with a foreign government or other foreign entity would not be doing so in accordance with any authority granted by the FAA as the State of Registry or State of the Operator. These activities are not included in the list of experimental certificate approved operations and may be subject to enforcement action by FAA. For those experimental aircraft operating overseas *within* the limitations of their certificate, FAA Order 8130.2, section 7, paragraph 4071 (b) states that if an experimental airworthiness certificate is issued to an aircraft located in or outside of the United States for time-limited operations in another country, the experimental airworthiness certificate must be accompanied by appropriate operating limitations that have been coordinated with the responsible CAA *before* issuance." For additional information on public aircraft status, refer to 76 FR 16349, Notice of Policy Regarding Civil Aircraft Operators Providing Contract Support to Government Entities (Public Aircraft Operations), dated March 23, 2011.	
100.	TO 00-80G-1 and Display Safety	Recommend the use of TO 00-80G-1, Make Safe Procedures for Public Static Display, dated November 30, 2002, in preparing for display of the aircraft. This document addresses public safety around aircraft in the air show/display environment. It covers hydraulics, egress systems, fuel, arresting hooks, electrical, emergency power, pneumatic, air or ground launched missiles, weapons release (including inert rounds), access panels, antennae, and other equipment that can create a hazard peculiar to certain aircraft.	

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OV-1 Risk Management, SOPs, and Best Practices			
101.	AFM Addendums	Consider additions or restrictions to the AFM to reflect safety issues discussed in this document.	
102.	Maximum Continuous Power	Adhere to all maximum continuous engine power time limits.	
103.	Specific Range and Minimum Fuel	Recommend standard operating procedures (SOP) addressing minimum landing fuel. Verify actual aircraft specific range (nautical air miles traveled per pound of fuel used).	
104.	Bingo and Minimum Landing Fuel	To add a safety margin, and in addition to § 91.151, Fuel Requirements for Flight in VFR Conditions, recommend establishing SOPs addressing minimum landing fuel for IFR operations as provided in § 91.167. In addition, a "Bingo" fuel status (a pre-briefed amount of fuel for an aircraft that would allow a safe return to the base of intended landing) should be used in all flights. Note: Bingo fuel and minimum landing fuel are not necessarily the same in that a call for Bingo fuel and an RTB still required managing the minimum landing fuel.	
105.	External Tank(s) Failure	Restrict external tanks to only those cleared by the manufacturer. Adhere to the drop tank limitations related to (1) takeoff and landing performance, (2) G limits, (3) airspeed, and (4) fuel in the tanks. There should not be any means of jettisoning these tanks while on the ground or in flight. There should not be any modifications to the drop tanks.	
106.	Cold Weather	Recommend establishing SOPs to address the aircraft's sensitivities to cold weather to include hydraulic seal failures and leakages and moisture freezing in airspeed systems and rupturing lines.	
107.	Suspected Flight Control Failure	Recommend establishing SOPs for troubleshooting suspected in-flight control failures, that is, specific checklist procedures, altitude, and clear location.	
108.	Asymmetric Wing Mounted Stores	No asymmetric wing mounted equipment is permitted regardless of the U.S. Army Dash (-10 or Operator's Manual).	
109.	Reporting Malfunctions and Defects	Ask the applicant/operator to report malfunctions and equipment defects found in maintenance, preflight, flight, and post-flight inspection. This would yield significant safety benefits to operators and the FAA.	

Attachment 4—Additional Resources and Recommendations

Additional Resources

- OV-1 accident reports issued by the NTSB, the U.S. Army, and other foreign operators such as the Argentinean Army.
- Australia's CAAP 30-3(0), *Approved Maintenance Organization (AMO) — Limited Category Aircraft,* Civil Aviation Advisory Publication, December 2001. This publication addresses the restoration and maintenance of ex-military aircraft and is an excellent guide for developing adequate aircraft maintenance and inspection programs.
- CAP 632, Operation of Permit to Fly Ex-Military Aircraft on the UK Register. This is a comprehensive source of information and guidance on topics like technical requirements, specialist equipment and systems, pilot/crew qualification, operational requirements, records and oversight procedure, and safety management.
- Chamberlain, H. Dean. FAA News, *Armed and Dangerous,* November/December 2003.
- *CJAA Safety Operations Manual*, June 30, 2009.
- Colavita, M. Chemistry Dept. of CSV, Italian Air Force. *Occurrence of Corrosion in Airframes.* RTO AVT Lecture Series on "Aging Aircraft Fleets: Structural and Other Subsystem Aspects," November 2000.
- Defense and Civil Institute of Environmental Medicine, Department of National Defense, Canada. *Ejection Systems and the Human Factors: A Guide for Flight Surgeons and Aeromedical Trainers,* May 1988.
- Drury, Colin G. and Watson, Jean (FAA). *Human Factors Good Practices in Borescope Inspection*, 2001.
- FAA. AC 150/5220-22, *Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns*
- FAA. AC 150/5300-13, *Airport Design*.
- FAA. AC 5220-9, *Aircraft Arresting Systems.*
- Morris, Greg. EAA Warbirds of America, Warbirds (magazine), *Warbird Airmanship*, March 2009.
- NATOPS. OPNAVINST 3710.7U, *General Flight and Operating Instructions*, November 23, 2009.
- *Naval Aviation Maintenance Program Standard Operating Procedures* (NAMPSOPs), chapter 10.
- NAVAIR 00-80T-109, *Aircraft Refueling NATOPS Manual*, June 15, 2002.
- New Zealand Civil Aviation Authority. AC 43-21, *Escape and Egress Systems*, December 25, 1997.
- NATOPS. NAVAIR 00-80R-14, *U.S. Navy Aircraft Firefighting and Rescue Manual*, October 15, 2003.
- U.S. Department of Defense Manual 4160.28 (volume 3), *Defense Demilitarization: Procedural Guidance*, June 7, 2011.
- USAF. AFP 127-1 and NAVAIR 00-80T-116-2, *Technical Manual Safety Investigation, Volume II Investigative Techniques*, July 31, 1987.
- USAF TO 1-1-691, Corrosion Prevention and Control Manual.

Recommendations for Review of Prior Actions

- As provided by § 91.415, review the submitted maintenance manual(s) and AIP and work with the applicant to revise the AIP as needed based on any concerns identified in attachment 2. For example, an OV-1 AIP can be modified to verify—
  - Consistency with the applicable airframe, powerplant, and systems military TOs, to verify replacement/interval times are covered.
  - All AIP section and sub-sections include the proper guidance/standards (that is, TOs or Engineering Orders) for all systems, groups, and tasks.
  - No "on condition" for items that have fixed replacement times unless justified with appropriate substantiating data.
  - Martin-Baker J5D ejection seat system replacement times. No "on condition" for rocket motors and propellants. Make the distinction between replacement times, that is, "shelf life" vs. "installed life limit." For example, a 9-year replacement in the AIP does not address a 2-year installed limit.
  - Any deferred log is related to a listing of minimum equipment for flight.
  - Inclusion of document revision page(s).
- Verify the application for airworthiness does not constitute brokering. Section 21.191(d) was not intended to allow for the brokering or marketing of experimental aircraft. This includes individuals who manufacture, import, or assemble aircraft, and then apply for and receive experimental exhibition airworthiness certificates so they can sell the aircraft to buyers. Section 21.191(d) only provides for the exhibition of an aircraft's flight capabilities, performance, or unusual characteristics at air shows, and for motion picture, television, and similar productions. Certificating offices must verify all applications for exhibition airworthiness certificates are for the purposes specified under § 21.191(d), and are from the registered owners who will exhibit the aircraft for those purposes. Applicants must also provide the applicable information specified in § 21.193.
- Review any related documents from U.S. Customs and Border Protection and the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) for the aircraft. If the aircraft was not imported as an aircraft, or if the aircraft configuration is not as stated in Form ATF-6, it may not be eligible for an airworthiness certificate.